

**PHYSICS 101
ASSIGNMENT #1**

1. A medical researcher wants to estimate the survival time of a patient after the onset of a particular type of cancer and after a particular regimen of radiotherapy.
 - a. What is the variable of interest to the medical researcher?
 - b. Is the variable in part a qualitative, quantitative discrete, or quantitative continuous?
 - c. Identify the population of interest to the medical researcher.
 - d. Describe how the researcher could select a sample from the population.
 - e. What problems might arise in sampling from this population?

2. Are some locations more windy than others? Does Chicago deserve to be nicknamed “The Windy City”? These data are the average wind speeds (in miles per hour) for 48 selected areas in the United States:

8.9	7.1	9.1	8.9	10.2	12.4	11.8	10.9	12.8	10.4
10.5	10.7	8.6	10.7	10.3	8.4	7.7	11.3	7.7	9.6
7.9	10.6	9.3	9.1	7.8	6.0	8.3	8.8	9.2	11.5
10.5	8.8	35.2	8.2	9.3	10.5	9.5	6.2	9.0	7.9
9.6	9.7	8.8	7.0	8.7	8.9	8.9	9.4		

- a. Construct a relative frequency histogram for the data. (HINT: Choose the class boundaries without including the value $x = 35.2$ in the range of values.)
 - b. The value $x = 35.2$ was recorded at Mt. Washington, New Hampshire. Does the geography of that area explain the observation?
 - c. The average wind speed in Chicago is recorded as 10.4 miles per hour. Do you consider this unusually windy?
3. In July or 2000, 22.4 million teenagers and young adults worked, a substantial number more than in April, when school is still in session. Many of these young people worked in amusement and theme parks, whose average number of employees jumps dramatically during the summer months. Here are the most common injuries suffered on the job by kids under 18:

<u>Most Common Injury</u>	<u>Percentage</u>
Bruises and contusions	14%
Cuts and lacerations	13%
Fractures	8%
Heat burns	9%
Sprains and strains	33%

- a. Are all possible injuries accounted for in the table? Is another category necessary?
 - b. Create a pie chart to describe the data.
 - c. Construct a relative frequency histogram for the data.

- d. Rearrange the bars in part c so that the categories are ranked from the largest percentage to the smallest,
- e. Which of the three methods of presentation – part b, c, or d – is the most effective?

4. A group of 50 biomedical students recorded their pulse rates by counting the number of beats for 30 seconds and multiplying by 2.

80	70	88	70	84	66	84	82	66	42
52	72	90	70	96	84	96	86	62	78
60	82	88	54	66	66	80	88	56	104
84	84	60	84	88	58	72	84	68	74
84	72	62	90	72	84	72	110	100	58

- a. Why are all of the measurements even numbers?
- b. Draw a stem and leaf plot to describe the data, splitting each stem in two lines.
- c. Construct a relative frequency histogram for the data.
- d. Write a sentence to describe the distribution of the student pulse rates.

5. A scientist from the Environmental Protection Agency took samples of the toxic substance polychlorinated biphenyl (PCB) levels from the soil at 60 different waste disposal facilities located throughout the United States. The following results (in 0.0001 grams per kilogram of soil) were obtained:

57	53	51	55	54	47	47	45	58	54
46	45	48	48	50	42	53	53	46	50
54	53	47	56	41	58	51	44	53	53
41	58	48	54	52	48	47	48	45	47
53	52	54	46	46	55	42	49	42	49

Draw a stem-and-leaf diagram for the data.

6. The following 40 amounts of the fees that Fast Delivery charged for delivering small freight items last Thursday afternoon.

4.03	4.30	5.46	4.15	5.02	3.56	3.86	3.87	4.07	5.24	3.10	4.57	6.81	3.77	4.02	6.04	3.59	4.91	5.77	5.44
5.62	4.57	3.62	4.63	3.89	2.93	2.88	3.80	4.81	4.00	3.82	5.02	3.70	2.86	2.99	7.86	4.65	3.16	5.16	3.62

Construct a RELATIVE frequency (expressed as a percentage of the cumulative frequency) histogram of these data.